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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,491	12/01/2003	Kiomars Anvari		1042

7590 04/07/2006
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EXAMINER

CHAN, RICHARD

ART UNIT PAPER NUMBER

2618

DATE MAILED: 04/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/724,491

Applicant(s)

ANVARI, KIOMARS

Examiner

Richard Chan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claims 1 and 6 are objected to because of the following informalities: Claims should only be one sentence long, please remove periods and replace with semi-colons. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1-3, 5-9, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Pinckley (US 6,983,026).

With respect to claim 1, Pinckley discloses the wireless Crest Factor reduction circuit for use with multi-carrier signals in a wireless communication system to enhance the linearity and performance of the amplifier, in particular wireless cellular, PCS, wireless LAN, line of sight microwave, military, and satellite communication systems and any other none wireless applications, the Crest Factor reduction circuit comprising:
A multi-carrier receiver for the Crest Factor reduction of IF or RF input signal to

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amplifier. If the input signal is baseband then the multi-carrier receiver is bypassed; a digital signal processing block to reduce the Crest Factor of the multi-carrier input signal. A digital signal processing block to limit or clip the amplitude of the multi-carrier signal. (Col.5 lines 41-59); a digital signal processing block that converts the amplitude clipped or limited multi-carrier baseband to baseband representative of individual carrier signals. (Col.9 lines 37-49); a digital signal processing block that filters the baseband representative of individual carrier baseband signal to remove unwanted signal produced due to clipping or limiting the multi-carrier signal amplitude; (Col. 5 lines 49-53); a digital signal processing signal that up converts the filtered baseband representative of each carrier to its original baseband frequency; (Col.7 lines 50-60) and Fig.2 (232,237,239); a multi-carrier transmitter block 201 that prepare the Crest Factor reduced multi-carrier signal for delivery to multi-carrier amplifier.

With respect to claim 2, Pinckley discloses the Crest Factor reduction circuit according to claim 1, wherein multi-carrier input signal from the wireless transmitter is sampled using sub-harmonic sampling technique at the input frequency or at an intermediate frequency. (Col.7 lines 19-39)

With respect to claim 3, Pinckley discloses the Crest Factor reduction circuit according to claim 1, wherein the multi-carrier input signal from the wireless transmitter is sampled using sub-harmonic sampling technique at the input frequency or at an intermediate frequency and the digitized multi-carrier input signal is decimated to the

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appropriate number of samples per symbol for further digital signal processing (203-205). (Col. 4 lines 52-63)

With respect to claim 5, Pinckley discloses the Crest Factor reduction circuit according to claim 1, wherein the multi-carrier input signals from the wireless transmitter are in bit domain and the bit domain baseband signals are up converted, combined and interpolated to produce the digital multi-carrier baseband signal with appropriate number of sample per symbol. (Col.6-7 lines 56-3)

With respect to claim 6, Pinckley discloses the Crest Factor reduction according to claim 1, wherein the digital multi-carrier signal is amplitude clipped or limited by a limiting or clipping function; (Col.5 lines 41-59); the amplitude limited multi-carrier signal is then down converted to single channel baseband signals by digital down conversion, channels 233, 237, 239; (Col.7 lines 50-66) the individual baseband signals are filtered and up converted back to their original baseband frequency before all individual baseband signals being combined again to produce the multi-carrier Crest Factor reduced baseband signal. (Col.6-7 lines 56-3)

With respect to claim 7, Pinckley discloses the Crest Factor reduction according to claim 1, wherein the multi-carrier signal amplitude clipping or limiting can be perform in analog domain at an intermediate frequency (IF), radio frequency, or analog baseband before being digitized. (Col.6 lines 56 -65)

With respect to claim 8, Pinckley discloses the Crest Factor reduction according to claim 1, wherein the amplitude limited digital multi-carrier baseband signal is converted to single channel baseband signals by digital down conversion. (Col.4 lines 65-67)

With respect to claim 9, Pinckley discloses the Crest Factor reduction circuit according to claim 1, wherein the Crest Factor reduced signal is digitally up converted and converted to analog domain at an intermediate frequency or the output frequency. (Col.6 lines 56-65)

With respect to claim 12, Pinckley discloses the Crest Factor reduction circuit according to claim 1, wherein the DSP function can be implemented in programmable logic, FPGA, Gate Array, ASIC, and DSP processor. (Col.4 lines 52-56)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4,10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinckley (US 6,983,026) in view of Peterzell (US 2002/0132597).

With respect to claim 4, Pinckley discloses the Crest Factor reduction circuit according to claim 1, however Pinckley does not disclose wherein the multi-carrier input signal from the wireless transmitter is baseband and is sampled using Nyquist sampling technique and interpolated to produce the baseband multi-carrier signal with appropriate number of samples per symbol.

The Peterzell reference however discloses the use of the Nyquist sampling technique to produce a signal with appropriate number of samples per symbol for the Analog to Digital converter. Paragraph [0087]

It would have been obvious to one of ordinary skill in the art to implement the Nyquist sampling technique used to produce a signal with the appropriate samples as disclosed by Peterzell with the Crest Factor reduction circuit disclosed by Pinckley in order to obtain the appropriate sampling rate for producing a multi-carrier signal.

With respect to claim 10, Pinckley discloses the Crest Factor reduction circuit according to claim 1, however Pinckley does not disclose wherein the received signal strength of the input signal to Crest Factor reduction circuit and transmit signal strength of the output from the Crest Factor reduction circuit is dynamically measures to adjust the total gain of the Crest Factor reduction circuit to zero

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The Peterzell reference however discloses the use of the RSSI measurement as the factor to control the power output of the RF device to a base station. Paragraph [100]

It would have been obvious to one of ordinary skill in the art to implement the RSSI measurement method as disclosed by Peterzell in order to calculate the appropriate power or gain to implement for the RF system as disclosed by Pinckley.

With respect to claim 11, Pinckley discloses the Crest Factor reduction circuit according to claim 1, however Pinckley does not disclose when it is used in wireless cellular, wireless PCS, wireless LAN, microwave, wireless satellite, none wireless amplifiers, and any wireless communication systems used for military applications.

The Peterzell reference however discloses the use of the RF circuit be implemented in a wireless PCS and Wireless LAN atmosphere.

It would have been obvious to one of ordinary skill in the art to implement the RF device being used in a wireless PCS and wireless LAN environment as disclosed by Peterzell with the crest factor reduction circuit as disclosed by Pinckley in order to implement the crest factor reduction circuit in many different wireless environments.

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The Pinckley and Peterzell references are analogous art because both references disclose inventions and methods in the wireless communications environment.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Kahn reference (US 5,625,893) discloses a satellite communications system with receiver distortion correction which is controlled by uplink transmission equipment.

The Kiykioglu reference (US 6,754,285) discloses a signal conditioning techniques in DMT- based transmissions.

The Samuels reference (US 6,947,710) discloses a transmitter having an amplified for amplifying a signal for transmission.

The Malec reference (US 5,150,072) discloses a distortion correction for an amplifier system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chan whose telephone number is (571) 272-0570. The examiner can normally be reached on Mon - Fri (9AM - 5PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on (571) 272-7882. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard Chan
Examiner
Division 2618
03/30/06


NAY MAUNG
SUPERVISORY PATENT EXAMINER